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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,054	11/25/2003	Carol Jeffcoate	HO2-0002	7777

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EXAMINER	
CHUO, TONY SHENG HSIANG	
ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/723,054	JEFFCOATE, CAROL	
	Examiner	Art Unit	
	Tony Chuo	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Appeal Brief, filed 2/29/08, with respect to the rejection(s) of claim(s) 12-25 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new grounds of rejection are made in view of Keegan and Shiomi et al.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 12, 14, 16-19, 22, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keegan (US 2003/0003339) in view of Shiomi et al (JP 02-238288).

The Keegan reference discloses a method of controlling a temperature of a solid oxide fuel cell stack comprising: providing a heated interconnect "104" (thermoelectric layer/thermoelectric device) in between electrochemical cells "110" & "112", wherein each heated interconnect is adjacent to an electrochemical cell, wherein each heated interconnect is in contact with at least one electrochemical cell, and wherein a power supply "130" provides electricity to the interconnect via the use of a controller; providing

an end cap "120" that is capable of functioning as a heat sink in thermal contact with a periphery of the fuel cell stack; measuring the temperature of the electrochemical cells adjacent to the thermoelectric layers at one or more locations across the electrochemical cells by using temperature sensors located at each interconnect; and utilizing the heated interconnects to provide a uniform heating of the SOFC stack (See paragraphs [0015],[0023],[0027],[0029] and Figures 1 and 3). It also discloses a power supply that can comprise any available electrical power source including a battery (See paragraph [0028]).

However, Keegan does not expressly teach adjusting the voltage of the power source in response to the measured temperature to heat or cool the temperature of the at least one fuel cell assembly in contact with the thermoelectric layer at the one or more locations of the fuel cell stack. The Shiomi reference teaches a method of adjusting the voltage of a variable voltage source "27" in response to a temperature that is monitored by a temperature sensor "23" to control the temperature of a substrate (See Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Keegan method of controlling a temperature of a fuel cell stack to include a step of adjusting the voltage of the power source in response to the measured temperature to heat or cool the temperature of the at least one fuel cell assembly in contact with the thermoelectric layer at the one or more locations of the fuel cell stack in order to utilize a heating method that enables a stable temperature control to be attained. In addition, the substitution of one known heating

method for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Examiner's note: The Shiomi reference is relevant to the Keegan reference and the applicant's field of endeavor because it solves the same problem of using a thermoelectric device to control the temperature of a substrate.

4. Claims 12, 14, 16-19, 22, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keegan (US 2003/0003339) in view of Moreau et al (US 5138136).

The Keegan reference discloses a method of controlling a temperature of a solid oxide fuel cell stack comprising: providing a heated interconnect "104" (thermoelectric layer/thermoelectric device) in between electrochemical cells "110" & "112", wherein each heated interconnect is adjacent to an electrochemical cell, wherein each heated interconnect is in contact with at least one electrochemical cell, and wherein a power supply "130" provides electricity to the interconnect via the use of a controller; providing an end cap "120" that is capable of functioning as a heat sink in thermal contact with a periphery of the fuel cell stack; measuring the temperature of the electrochemical cells adjacent to the thermoelectric layers at one or more locations across the electrochemical cells by using temperature sensors at each interconnect; and utilizing the heated interconnects to provide a uniform heating of the SOFC stack (See paragraphs [0015],[0023],[0027],[0029] and Figures 1 and 3). It also discloses a power supply that can comprise any available electrical power source including a battery (See paragraph [0028]).

However, Keegan does not expressly teach adjusting the voltage of the power source in response to the measured temperature to heat or cool the temperature of the at least one fuel cell assembly in contact with the thermoelectric layer at the one or more locations of the fuel cell stack. The Moreau reference teaches a method of controlling a current by adjusting the voltage supplied to the terminals of a thermoresistance element as a function of the heating power to be delivered to a member (See claim 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Keegan method of controlling a temperature of a fuel cell stack to include a step of adjusting the voltage of the power source in response to the measured temperature to heat or cool the temperature of the at least one fuel cell assembly in contact with the thermoelectric layer at the one or more locations of the fuel cell stack in order to enable a substantial reduction in the difference between the nominal power and the usable power. In addition, the substitution of one known heating method for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Examiner's note: The Moreau reference is relevant to the Keegan reference and the applicant's field of endeavor because it solves the same problem of using a thermoelectric device to control the temperature of a substrate.

5. Claims 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keegan (US 2003/0003339) in view of Shiomi et al (JP 02-238288) as applied to claims 12 and 18 above, and further in view of Kaneko (JP 06-318736).

However, Keegan as modified by Shiomi et al does not expressly teach thermoelectric devices that are Peltier devices. The Kaneko reference teaches a method of controlling the temperature of a substrate by using a thin film Peltier thermoelectric element (See paragraph [0013]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Keegan/Shiomi method of controlling a temperature of a fuel cell stack to include thermoelectric devices that are Peltier devices in order to utilize a thermoelectric device that allows for the temperature control of a bigger heating value. In addition, the substitution of one known thermoelectric device for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

6. Claims 15 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keegan (US 2003/0003339) in view of Shiomi et al (JP 02-238288) as applied to claim 12 and 18 above, and further in view of Cargnelli et al (US 5753383).

However, Keegan as modified by Shiomi et al does not expressly teach a power source that is the fuel cell assembly. The Cargnelli reference discloses a thermoelectric element that is electrically connected to the fuel cell stack so that the fuel cells' current can be applied to the thermoelectric element (See column 4, lines 47-51).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Keegan/Shiomi method of controlling the temperature of the fuel cell stack to include a power source that is the fuel cell assembly in order to more efficiently utilize the power generated by the fuel cell stack to maintain

the fuel cell at a uniform temperature. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keegan (US 2003/0003339) in view of Shiomi et al (JP 02-238288) as applied to claims 18 and 19 above, and further in view of Walsh (US 2003/0044662).

However, Shirai as modified by Kaneko does not expressly teach temperature sensing devices that are thermocouples. The Walsh reference discloses a thermocouple coupled to a control circuit for regulating the temperature of the fuel cell (See paragraph [0026]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Keegan/Shiomi method of controlling the temperature of the fuel cell stack to include thermocouples associated with each thermoelectric device so that temperature of the fuel cell can be more reliably measured. In addition, the substitution of one known temperature sensing device for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 7:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795